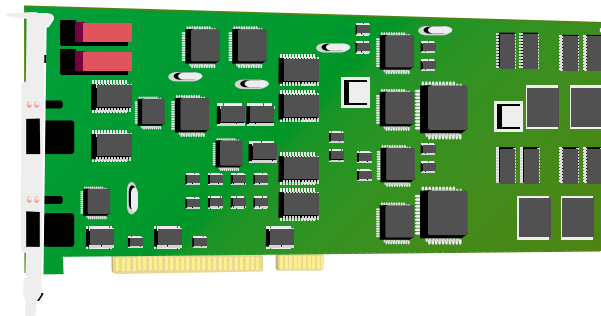
MultiModemISI

MultiModemISI Hybrid Series

Models ISIHP- 1S/2S/2U, ISIHP- 4S/4U/4SD, and ISIHI-2S/2U



Quick Start Guide

MultiTech® Systems

MultiModemISI Hybrid Server Cards

Models ISIHP-1S/2S/2U/4S/4U/4SD & ISIHI-2S/2U

Quick Start Guide

82093804 Revision E

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Record of Revisions

Revision	*Description*
D	Updated info on Win2000 , Windows Me, Linux-RPM, Novell, regulatory, & safety (5/8/01).
E	Revised to remove V100 capability.

Patents

This product is covered by one or more of the following U.S. Patent Numbers: 5.301.274, 5.309.562, 5.355.365, 5.355.653, 5.452.289, 5.453.986. Other patents Pending.

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Welcome to Multi-Tech's MultiModemISI Hybrid Series of ISDN BRI server cards. The series consists of eight models:

Model	Bus Type	# of ISDN BRI Lines Accepted	ISDN Inter-face	# of Modem Ports	# Term. Adap. Ports	Max. Concurrent Sessions
ISIHP-2S	PCI	2	S	4	4	4
ISIHP-2U	PCI	2	U	4	4	4
ISIHP-4S	PCI	4	S	8	8	8
ISIHP-4U	PCI	4	U	8	8	8
ISIHI-2S	ISA	2	S	4	4	4
ISIHI-2U	ISA	2	U	4	4	4
ISIHP-1S	PCI	1	S	2	2	2
ISIHP-4SD	PCI	4	S	none	8	8

The 2S/2U and 4S/4U models are all multiport hybrid ISDN cards that can be plugged into a server expansion slot (PCI or ISA, as listed) for applications that involve ISDN or modem calls over ISDN BRI lines. When the ISI card is used with Remote Access Servers (RAS), remote users can call in using either modems or ISDN terminal adapters (TAs). For V.90 modem calls, a 56kbps download speed can be achieved without the expense of T1, E1, or ISDN PRI lines. S-models use the ISDN "S" interface; U-models use the ISDN "U" interface.

This manual also describes the ISIHP-1S and the ISIHP-4SD cards. The ISIHP-1S is a revised version of the ISIHP-2S card that has been altered to accept one ISDN Basic Rate Interface line rather than two.

The ISIHP-4SD is a serial interface card equipped with four terminal adapters only (no analog modems are present). The ISIHP-4SD is otherwise like the ISIHP-4S/4U models.

The ISIHP-2S/2U contains two terminal adapters and four V.90/ K56flex modems. The ISIHP-2S/2U uses two ISDN BRI lines (each offering two B-channels) to connect to the telco and these connect to its two built-in terminal adapters. In addition to handling ISDN calls, each terminal adapter can detect analog modem and fax calls. When analog calls are detected, they are automatically connected to one of the four V.90 modems on the ISIHP board. In this way, these hybrid cards can handle either ISDN calls or analog modem calls. Although the ISIHP-2S/2U contains four ISDN TA ports and four analog modem ports, only four ports can be active at any one time (because only four B-channels are present). See Figure 1-1. The ISIHI-2S/2U function like the ISIHP-2S/2U units but have an ISA-type bus which requires manual setting of the I/O address and the interrupt request (IRQ).

The ISIHP-4S/4U works like the ISIHP-2S/2U but contains four terminal adapters and eight V.90/K56flex modems. The 4S and 4U models each accommodate four ISDN BRI lines. The configuration of modem and TA ports for the 4S and 4U models is shown in Figure 1-2.

The ISIHP-4SD contains four terminal adapters only (the daughter card containing the eight modems is absent). Since it accommodates four ISDN BRI lines (each offering two B-channels), it supports eight independent digital data connections.

Each terminal adapter appears as two ports to the server PC using the ISI card.

ISIHx cards also support dial-out applications via their modems or terminal adapters.

MultiTech's ISI Management Software is designed to monitor data traffic and control the modems/TAs of ISIHx server cards operating in the Windows 2000 Server and Advanced Server OSs. (See the ISI Management Software User Guide, doc #88301450.)

The ISIHP-2S/2U and ISIHI-2S/2U cards each offers eight RAS ports using two Basic Rate Interface (BRI) ISDN lines; the ISIHP-4S/4U has 16 ports using four BRI ISDN lines. The eight ports of the 2S/2U models allow a server to accept any combination of analog modem and digital ISDN calls, making a maximum of four simultaneous independent data connections (sessions). For the ISIHP-4S/4U, its sixteen ports allow a server to accept any combination of analog modem and digital ISDN calls, making a maximum of eight simultaneous independent data connections. This arrangement gives the user the flexibility to customize the settings of the terminal adapters and modems. The terminal adapters on the ISIHP-4SD can make eight simultaneous independent connections.

From the perspective of the server PC, the ISIHP-2S/2U (or ISIHI-2S/2U) is an eight-port serial card with eight devices permanently attached to the serial ports (Figure 1-1). The first four ports are the two terminal adapters, each of which appear as two ports. The remaining four ports are the four central site modems. The following chart summarizes the correlation of ports and devices.

2S/2U Port #	Device	ISDN Line Number
1	TA	1
2	TA	1
3	TA	2
4	TA	2
5	Modem	1
6	Modem	1
7	Modem	2
8	Modem	2

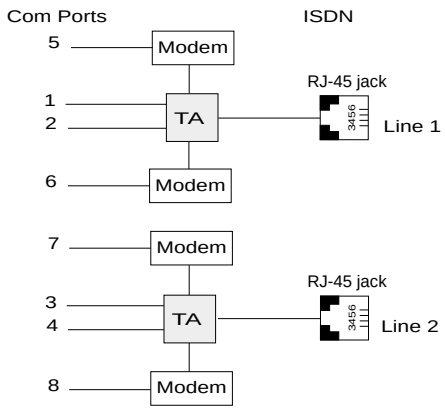


Figure 1-1: Modems and Terminal Adapters of ISIHP-2S/2U and ISIHI-2S/2U.

From the perspective of the server PC, the ISIHP-4S/4U is an sixteen-port serial card with sixteen devices permanently attached to the serial ports (Figure 1-2). The first eight ports are the four terminal adapters, each of which appear as two ports. The remaining eight ports are the eight central site modems. The following chart summarizes the correlation of ports and devices. The ISIHP-4SD contains terminal adapters only; no modems are present.

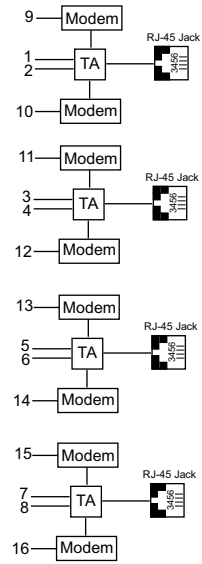


Figure 1-2: Modems and Terminal Adapters of ISIHP-4S/4U (for ISIHP-4SD, no modems are present)

4S/4U Port #	Device	ISDN Line Number
1	TA	1
2	TA	1
3	TA	2
4	TA	2
5	TA	3
6	TA	3
7	TA	4
8	TA	4
9	Modem	1
10	Modem	1
11	Modem	2
12	Modem	2
13	Modem	3
14	Modem	3
15	Modem	4
16	Modem	4

About This Manual

This ISI Quick Start Guide contains installation instructions and technical support information. In the instructions given here, minimal basic PC skills are assumed. The ISIHx User Guide, on the Multi-Tech product CD, contains certain information and details that have been omitted from this present manual, including AT command descriptions and installation instructions for Windows 95/98/Me.

Peripheral Component Interconnect (PCI) for ISIHP Cards

First developed by companies such as Intel™, AT&T™ and Digital Equipment Corporation™, the Peripheral Component Interconnect

(PCI) bus used by your ISIHP card provides high performance and is easy to use. Because PCI devices contain registers with the device information required for configuration, full auto configuration of PCI Local Bus add-in boards and components is supported. Performance factors include a bus data path of 32 bits, and clock speeds of 33 MHz.

Communication Protocols for ISIHP Ports

Ports on the ISIHP card can be associated with different protocols, as follows:

Auto-Protocol. Terminal adapter automatically detects and switches to use the protocol of the client terminal adapter.

Auto-Protocol Callback. Same as Auto-Protocol except that it causes the host terminal-adapter to dial back with the same protocol with which the client dialed in.

Central Site Modem. The digitally terminated V.90 modems built into ISIHx series cards (except the 4SD model). For the ISIHP-2S/2U, the last four modems should be designated as Central-Site modems; for the ISIHP-4S/4U, the last eight modems should be designated as Central-Site modems. (See Port/Device table on previous page.)

PPP async. (Point-to Point Protocol, asynchronous) Protocol allowing computers a dial-up connection to the Internet. PPP includes error detection, data compression and other improvements over Serial Line Internet Protocol (SLIP) connections.

V.120. Terminal rate adaptation protocols. These apply to ISDN B-channels when using a V interface.

X.75. An international standard that allows X.25 packet-switched networks to communicate with each other. X.75 is a gateway protocol for interconnection of X.25 public networks.

Chapter 2:
Hardware Installation

Introduction

This section describes how to install the ISIHx server card into the expansion slot in your personal computer, which involves

- Opening your PC
- Installing the card into the PC (ISIHP uses PCI-bus expansion slots; ISIHI uses ISA slots)
- Set I/O address DIP switch and IRQ jumper (ISIHI only)

Computer Requirements

- Pentium-based PC or compatible (PCI bus required for ISIHP; ISA required for ISIHI)
- Microsoft Windows 2000, Windows 95, Windows 98, Windows Me, Windows NT versions 3.51 and 4.0, SCO Open Server version 5.0, Novell NetWare, or Linux
- CD-ROM drive, floppy disk drive (for use in cases where drivers are downloaded from web site)
- 800 blocks of hard disk space for UNIX, 100K bytes for Windows NT, 34K bytes for Windows 95, 50K bytes for Novell

Shipping Contents

- ISIHx card
- RJ-45 ISDN cords (1 for ISIHP-1S; 2 for ISIHx-2S/2U; 4 for ISIHP-4S/4U/4SD)
- ISI Product Family CD-ROM (containing drivers, utilities, & documentation)
- Quick Start Guide

Safety Warnings Telecom

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jacks are specifically designed for wet locations.
3. This product is to be used with UL and cUL listed computers.
4. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
5. Use caution when installing or modifying telephone lines.
6. Avoid using a telephone (other than cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
7. Do not use the telephone to report a gas leak in the vicinity of that leak.
8. To reduce the risk of fire, use only No. 26 AWG or larger Telecommunication line Cord.

Hardware Installation Procedure

1. Before handling the ISIHP card, discharge any static in your body by touching a piece of grounded metal such as the computer chassis.
2. Carefully remove the ISIHP card from its antistatic bag, handling it only by the mounting bracket and edges. Do not touch the gold-plated connectors along the bottom edge. (You may want to save packaging for possible future use.)

3. Visually inspect the ISIHP-2S/2U/4S/4U/4SD. If you have any concerns about the condition of your ISI card, call Technical Support at (800) 972-2439.

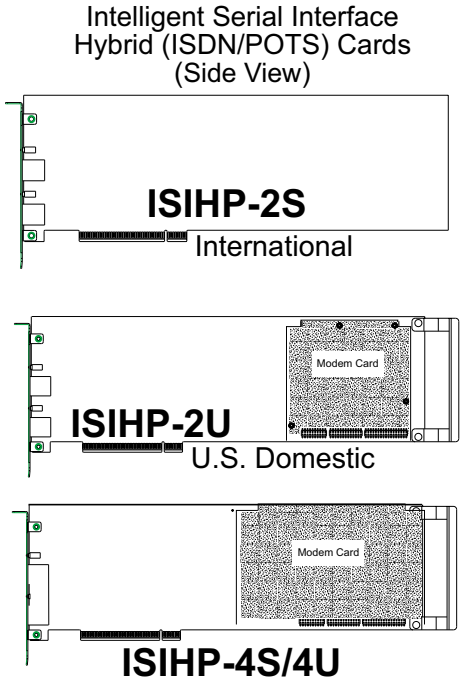


Figure 1-3: ISIHP Cards; Side View (on ISIHP-4SD, right daughter card is not present)

4. To avoid damaging the ISI card and your PC, make sure your computer and any peripheral equipment connected to it are turned off. The ISIHP can be installed in a Pentium equivalent PCI bus computer; the ISIHI can be installed into a Pentium equivalent computer with ISA slots.
5. Remove the cover of your computer as instructed in your computer's documentation.
6. Locate the unused expansion slot you will be using for your ISI card and remove the slot cover according to instructions in your computer's documentation.

7. Install the ISI card in the selected expansion slot in the same manner as any other add-on card according to your computer's documentation.
8. Fasten retaining bracket to computer chassis and replace the cover.
9. Connect the ISI to your ISDN telephone wall jack(s) with the provided modular telephone cable.

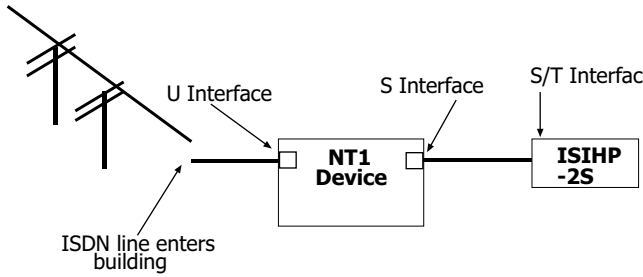


Figure 1-4: ISDN Interfaces at Customer Premises

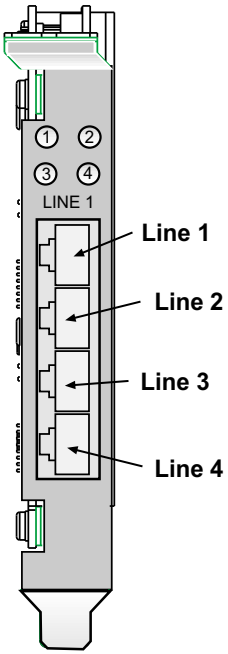
***Note**: The ISIHP and ISIHI communicate over ISDN lines. If you don't have a standard modular jack near your computer, you should install one or have one installed by your telephone company. In the US, installation kits and adapters are available wherever telephones are sold.*

***Note:** If S/T-interface ISDN network connection cable is used, the ISDN phone cord should be connected between the ISDN network connection cable and the NT1 device. If the S/T-interface model (ISIHP-2S, -4S, or 4SD, or ISIHI-2S) is used, then the S/T-interface must be connected to the S-interface on the NT1 device.*

10. Turn on power to the computer. Now you are ready to install software.

LED Indicators

The mounting brackets for the various ISI cards are similar, but the LEDs are labeled differently. Below, and on the next page, are graphics for each bracket along with descriptions of the LED indicators.

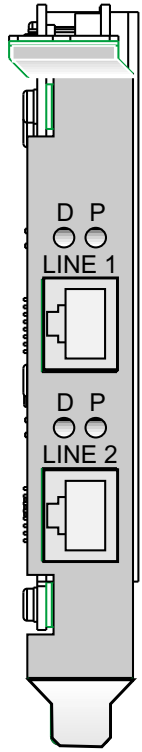


ISIHP-4U LEDs (one LED per BRI)

- Flashes between OFF and RED to indicate that neither SPID for that ISDN line has been verified.
- Flashes between RED and GREEN to indicate that one SPID is correct.
- A solid GREEN display indicates that both SPIDs are correct.

ISIHP-4S/4SD LEDs (one LED per BRI)

- Solid GREEN indicates normal operation.
- Flashes between RED and GREEN to indicate that the device has been reset.



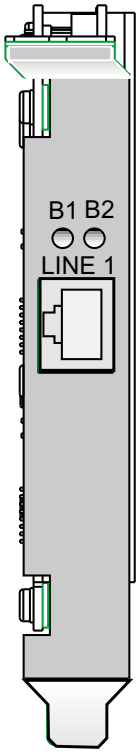
ISIHP-2U LED Indicators

P LED Indicator

- Indicates U interface status connection.
- Controlled by NT-1, which converts S/T interface (4-wire ISDN) to U interface (2-wire ISDN).
- When U interface and S/T interface are NOT active, LED remains off.
- Flashes 8 times/second (8 Hz)—U interface is attempting to activate.
- Flashes once/second (1 Hz)—U interface is active; S/T interface is not fully active.
- Lit, not flashing—Both U and S/T interfaces are active.

D LED Indicator

- Lights when the ISIHP-2U is turned on.
- Flashes until SPIDs are verified with the central office switch; then remains lit without flashing.
- Indicates data link layer status.



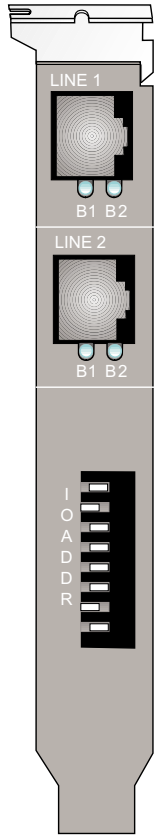
ISIHP-1S LED Indicators

B1 LED Indicator

- When lit, indicates active or voice connection on B-channel 1.

B2 LED Indicator

- When lit, indicates active or voice connection on B-channel 2.



ISIHI-2S LED Indicators

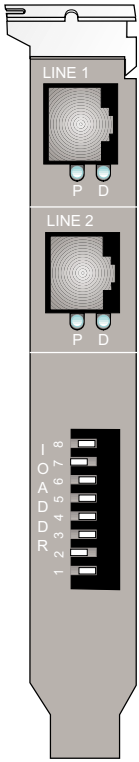
B1 LED Indicator

- When lit, indicates active or voice connection on B-channel 1.

B2 LED Indicator

- When lit, indicates active or voice connection on B-channel 2.

The settings of the multiple DIP switch unit on the mounting bracket determine the base Input/Output address for the ISIHI-2S/2U card. Input/Output (I/O) addresses are used to route information to and from the card.



ISIHI-2U LED Indicators

P LED Indicator

- Indicates U interface status connection.
- Controlled by NT-1, which converts S/T interface (4-wire ISDN) to U interface (2-wire ISDN).
- When U interface and S/T interface are NOT active, LED remains off.
- Flashes 8 times/second (8 Hz)—U interface is attempting to activate.
- Flashes once/second (1 Hz)—U interface is active; S/T interface is not fully active.
- Lit, not flashing—Both U and S/T interfaces are active.

D LED Indicator

- Lights when the ISIHI-2U is turned on.
- Flashes until SPIDs are verified with the central office switch; then remains lit without flashing.
- Indicates data link layer status.

The settings of the multiple DIP switch unit on the mounting bracket determine the base Input/Output address for the ISIHI-2S/2U card. Input/Output (I/O) addresses are used to route information to and from the card.

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Introduction

This chapter describes software/driver installation for the ISI cards when used in Windows 2000, Windows NT4, Windows NT3.51, Novell, Linux, and SCO Open Server 5. We also describe installation of MultiTech's Management Software for use with ISI cards under Windows 2000.

Installing ISIHI Software for Windows 2000

1. Turn off the PC.
2. The ISIHI card must already be installed in an ISA expansion slot in the PC. If it is not, follow the PC manufacturer's instructions concerning installation of expansion cards. Observe standard precautions regarding electro-static discharge (ESD) when handling the ISIHI board (the board should be kept in its shipping bag until used). During installation, handle the ISIHI circuit card by its edges and keep one hand in contact with the PC chassis. Set the Base I/O Address and the Interrupt Request (IRQ) values per the table below:

Recommended Base I/O Address and IRQ Values

ISIHI-2S/2U	Base I/O Address	IRQ
Initial 8 port board	210h	10
First 8 port upgrade	220h	11
Second 8 port upgrade	230h	12
Third 8 port upgrade	240h	15

The I/O Address DIP Switch is on the endplate of the ISIHI; the IRQ Jumper Block is on the component side of the circuit card, lower middle area.

3. Turn on the PC and start Windows 2000.
4. Insert the ISI installation CD into the CD drive in your computer (in cases where the driver files have been downloaded from the Multi-Tech web site and copied onto diskette, insert the diskette into the floppy drive now).

5. Go to **Start | Settings | Control Panel | Add/Remove Hardware**.

   Click **Next**.

6. At the **Choose a Hardware Task** screen, select "Add/Troubleshoot a device." Click **Next**.

7. At the **Choose a Hardware Device** screen, select "Add a new device." Click **Next**.

8. At the **Find New Hardware** screen, select "No, I want to select the hardware from a list." Click **Next**.

9. At the **Hardware Type** screen, select "Multi-port serial adapters." Click **Next**.

10. At the **Select a Device Driver** screen, click on **Have Disk**.

11. At the **Install from Disk** screen, enter the pathof the driver files (i.e., the file directory location, in most cases on CD-ROM). Click **OK**.

12. In the **Models** list, highlight "Multi-Tech ISI4608-ISA 8 Port Serial Card."

    A comment screen appears indicating that the Base I/O Address and IRQ must be specified for the ISIHI card. Click **OK**.

13. The **Add New Hardware Wizard Properties** screen appears.

A. In the **Resource Settings** field, select "Input/Output Range" and click on Change Setting. The **Edit Input/Output Range** screen appears.

   Select the value that matches the Base I/O Address value that you have already set on the ISIHI board in Step 2. Click **OK**.

B. In the **Resource Settings** field, select "Interrupt Request" and click on **Change Setting**. The **Edit Interrupt Request** screen appears.

   Select the value that matches the IRQ value that you have already set on the ISIHI board in Step 2. Click **OK**. At the **Resources** tab, click **OK** again.

14. At the **Start Hardware Installation** screen, click **Next**.

15. A completion screen appears. Click **Finish**.

16. You will be prompted to restart your computer. Click **Yes**.

Installing ISIHP Software for Win 2000

NOTE: A series of 'installation wizard' screens will appear repeatedly during this procedure (step 12). This is not an error. Do not discontinue the procedure when the 'installation wizard' screens repeatedly appear.

1. Shut down Windows 2000 and turn off the PC.
2. Install the ISIHP card in an available PCI expansion slot in the computer. Follow the computer manufacturer's instructions concerning installation of expansion cards. Observe standard precautions regarding electro-static discharge (ESD) when handling the ISIHP board (the board should be kept in its shipping bag until used). During installation, handle the ISIHP circuit card by its edges and keep one hand in contact with the PC chassis.
3. Turn on the PC and start Windows 2000.
4. Insert the ISI driver CD-ROM into the CD-ROM drive (if drivers have been downloaded from the MultiTech web site, they will typically be on diskette; in that case, insert diskette into floppy drive).
5. Windows 2000 will detect the ISIHP card. The **Found New Hardware Wizard- Welcome** screen will appear. Click **Next**.
6. The **Install Hardware Device Drivers** screen appears. Select "Search for a suitable driver ..." and click **Next**.
7. The **Locate Driver Files** screen appears (Windows 2000 is seeking the driver for the ISIHP card). Select "CD-ROM drives" and click **Next**.
8. The **Driver File Search Results** screen appears. Click **Next**.
9. A progress screen will appear briefly while files are being copied.
10. A completion screen will appear. Click **Finish**.
11. Immediately after the ISI driver installation has been completed, another **Found New Hardware** screen will appear briefly indicating that the "MultiTech ISI Port" has been detected.

    A second sequence of 'installation wizard' screens appears. This

sequence of screens deals with the setting up of ISI ports. The first screen in this sequence is the **Found New Hardware Wizard -- Welcome** screen.

The **Found New Hardware -- MultiTech ISI Port** screen will appear once for each modem and terminal adapter on the ISIHP card:

• 16 times for the ISIHP-4S/4U/4SD (although only 8 devices can be installed on the 4SD); or,

• 8 times for the ISIHP-2S/2U/1S (although only 4 devices can be installed for the ISIHP-1S).

12. The **Install Hardware Device Drivers** screen appears.

    Select "Search for a suitable driver ... " and click **Next**.

13. The **Locate Driver Files** screen appears (Windows 2000 is seeking the ISI Port device driver). Select "CD-ROM drives" and click **Next**.

14. The **Driver Files Search Results** screen will indicate that the "isiport.inf" file has been found on the CD-ROM. Click **Next**.

15. A completion screen will appear. It will indicate that the first "MultiTech ISI Port" has been set up successfully. Click **Finish**.

    Notice that the auto-detection facility of Windows 2000 will repeat the "ISI Port" installation sequence 7 more times for ISIHP-1S/2S/2U, or 15 more times for ISIHP-4S/4U/4SD. That is, the **Found New Hardware -- MultiTech ISI Port** screen will appear many times after the ISI driver has been located. On this screen, the messages "Found New Hardware" and "Installing ..." will appear alternately.

    Please understand that the repetition of these screen sequences is normal and is not an error. It does not indicate any problem with your PC, or with the MultiTech ISI card, or its driver software.

16. Driver installation for the ISIHP card is complete.

ISIHx for Win 2000: Installing ISI Management Software (server OSs only)

If you are using a Windows 2000 Server operating system ("Server" or "Advanced Server"), you must decide whether you want to use the MultiTech ISI Management Software in conjunction with your ISIHx board. The ISI Management Software is shipped with the ISI card.

1. Turn on your computer and start Windows 2000.
2. Insert the CD-ROM containing the ISI Management Software into your CD-ROM drive. (If ISI Management Software has been downloaded from the MultiTech web site, it will typically be on a diskette. In that case, insert diskette into floppy drive).
3. Go to **Start | Run**. In the **Run** window, enter the file path of the ISI Management software. Typically, this would be `E:\SERVCARD\UTILITY\MGMT\SETUP.EXE`. Click **OK**.
4. The **ISI Management** setup screen appears. At the **Welcome** screen, click **Next**.
5. A progress screen appears while files are copied. If the **Error Creating WWW Server** message appears, it may indicate that there was an attempt to install the ISI Management Software on a client version of Windows 2000. (The ISI Management Software can be installed only in the *Windows 2000 Server* and *Windows 2000 Advanced Server* operating systems.)
6. A completion screen appears.

Select "Yes, I want to restart my computer now" and click **Finish**.

After the computer has restarted, the installation of the driver and of the ISI Management Software will be complete.

ISIHx for Windows 2000: Installing TAs and Modems to COM Ports

Pre-Requisite: Installation of Windows 2000 driver software must be completed before you can install the terminal adapters and modems of the ISIHx card.

1. Go to **Start | Settings | Control Panel | Phone and Modem Options**.
2. The **Location Information** screen appears.

   Enter the appropriate area code and access number. Click **OK**.
3. At the **Phone and Modem Options** screen, click on the **Modems** tab and click **Add**.
4. At the **Install New Modem** screen, click on "Don't detect my modem ... " and click **Next**.
5. If the software driver CD-ROM (or other media, in cases of using drivers downloaded from the MultiTech web site) is not already in the appropriate disk drive in the PC, insert it now.
6. If you are installing an ISIHP-1S card, go to step 25 for special instructions and then return to step 7. Otherwise go directly to step 7.

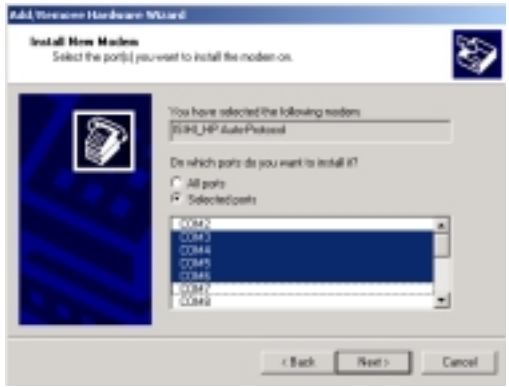
Installing Terminal Adapters to COM Ports.

7. The **Add/Remove Hardware Wizard** screen will appear.

   Click “Have Disk ... .”
8. The **Install from Disk** screen will appear.

   Type or browse for the file path of the terminal adapter software (for example, E:\servcard\drivers\win2000). Click **OK**.
9. The **Install New Modem** screen will appear.

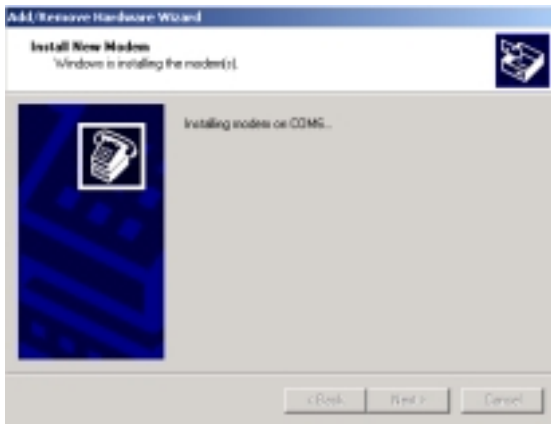
   Highlight the terminal adapter protocol to be used. Click **Next**.
10. The **‘Install New Modem** - *port list’* screen will appear.



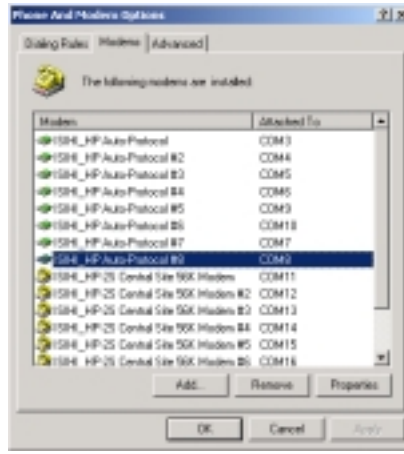
Highlight the COM ports on which you want terminal adapters to be installed. You must allocate 8 ports for the ISIHP-4S/4U/4SD, or 4 ports for the ISIHP-2S/2U/1S, or 4 ports for the ISIHI-2S/2U. (*Note that, even though the ISIHP-1S will only support two modem ports, it is necessary to allocate four ports temporarily during installation. The allocated-but-unused ports can be used for a different purpose after installation is complete.*)

Click **Next**.

11. A progress screen will appear as TA installation begins.
12. As TAs are installed to the specified COM ports, a separate screen will appear denoting the process for each COM port.



13. A completion screen will appear. Click **Finish**.
14. The **Phone and Modems Options** screen (**Modems** tab) will re-appear and display the TAs that have just been assigned to COM ports.



If you are installing a ISIHP-4SD, installation is now complete. (The 4SD has no modems.)

Installing modems to COM Ports (not applicable to -4SD):

15. At the **Phone and Modems Options** screen (**Modems** tab), click **Add**.
16. The **Install New Modems** screen will appear.

    Select "Don't detect my modem ...."

    Click **Next**.
17. A screen listing modem manufacturers and models will appear.

    Click "Have Disk ...."
18. The **Install from Disk** screen will appear.

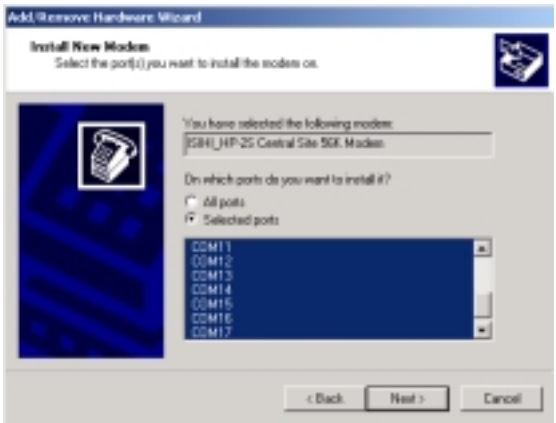
    Type or browse for the file path of the modem software (for example, E:\servcard\drivers\win2000). Click **OK**.
19. The **Install New Modem** screen will show a list of MultiTech modem and terminal adapter drivers. Select the modem type that fits the model of your specific server card. For 1S/2S/4S models,

select "ISIHI_HP-2S Central Site 56K Modem." For 2U/4U models, select "ISIHI_HP-2U Central Site 56K Modem."

Click **Next**.

20. The Install New Modem port list screen will appear. Highlight the COM ports on which you want modems to be installed. You must allocate 8 ports for the ISIHP-4S/4U, or 4 ports for the ISIHP-2S/2U/1S, or 4 ports for the ISIHI-2S/2U.

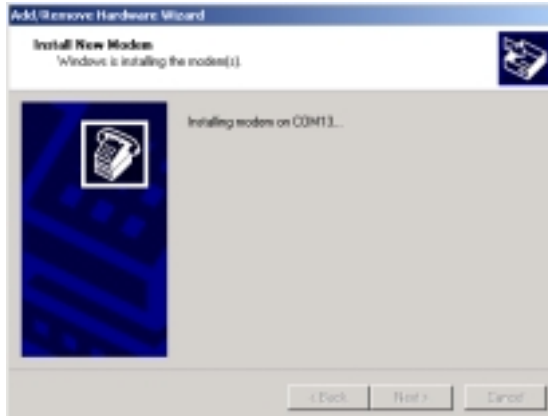
    NOTE about ISIHP-1S. Although the ISIHP-1S supports only two modems, you must designate 4 ports during installation. Furthermore, the COM port numbers used must allow for 4 terminal adapter ports, even though 2 terminal adapter ports will remain unused. For example, if you allocated COM3, COM4, COM5, and COM6 to terminal adapters for the ISIHP-1S, you could allocate COM7, COM8, COM9, and COM10 to modems for the ISIHP-1S. COM5, COM6, COM9, and COM10 would be unused by the ISIHP-1S and so could be allocated to a different function after installation of the ISIHP-1S is complete.



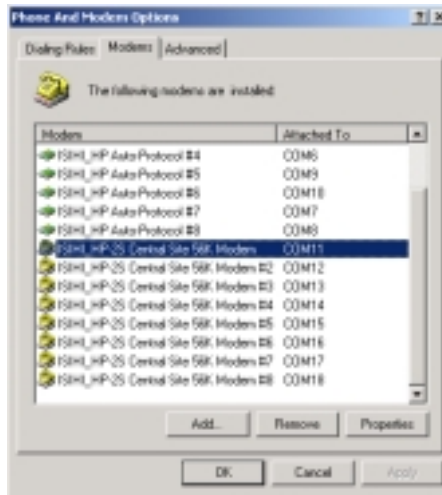
Click **Next**.

21. A progress screen will appear as modem installation begins.

22. Screens denoting the installation of modems to specific COM ports will appear.



23. A completion screen will appear. Click **Finish**.
24. The **Phone and Modems Options** screen (**Modems** tab) will re-appear and display the modems that have just been assigned to COM ports.

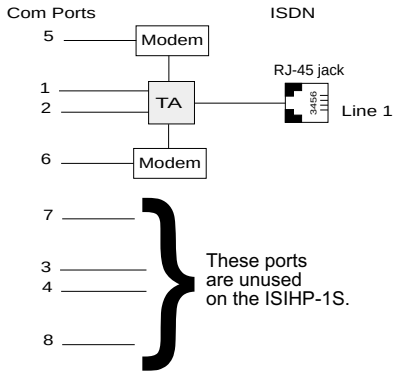


Installation of terminal adapters and modems to COM ports is now complete.

25. ***For the ISIHP-1S card only***. The ISIHP-1S is a scaled-back revision of the ISIHP-2S card meant for low-density applications where hybrid flexibility (having TAs and modems on the same card) is advantageous.

    The diagram below describes the design differences between the ISIHP-1S and ISIHP-2S. It also summarizes how the ISIHP-1S must be treated during installation.

ISIHP -- Differences between “1S” and “2S” versions, especially COM port assignments



When installing ISIHP-1S software:

(a) treat ISIHP-1S as an 8-port card;
(b) assign first 2 ports as terminal adapters (TAs);
(c) skip two port numbers;
(d) assign next 2 ports as analog modems.

(e) Other devices can use port numbers that were skipped by the ISIHP-1S.

Remove ISIHx Driver (Windows 2000)

1. Go to **Start** | **Settings** | **Control Panel**.
2. Click on **Add/Remove Hardware**. Click **Next**.
3. Click on "Uninstall/Unplug a device" and click **Next**.
4. In the subsequent screen, click on "Uninstall a device" and click **Next**.
5. At the **Add/Remove Hardware Wizard** screen, highlight the ISI driver file for the specific server card that you intend to remove. Click **Next**.
6. When you are asked to confirm removal, click on the **Yes** radio button and click **Next**.
7. Click **Finish**. You can remove the driver for only one ISIHx card at a time.

ISIHx Software Installation Procedure for Windows NT 3.51/4.0

1. Turn off the PC.
2. The ISIHx card must be installed in an expansion slot in the PC. If not, follow the PC manufacturer's instructions concerning installation of expansion cards. Observe standard precautions regarding electro-static discharge (ESD) when handling the ISIHx board (the board should be kept in its shipping bag until used). During installation, handle the ISIHx circuit card by its edges and keep one hand in contact with the PC chassis.

   For ISIHP cards. Install the ISIHP card in an available PCI expansion slot in the computer.

   For ISIHI cards. Install the ISIHI card in an available ISA expansion slot in the computer. Set the Base I/O Address and the Interrupt Request (IRQ) values per the table below:

Recommended Base I/O Address and IRQ Values

ISIHI-2S/2U	Base I/O Address	IRQ
Initial 8 port board	210h	10
First 8 port upgrade	220h	11
Second 8 port upgrade	230h	12
Third 8 port upgrade	240h	15

The I/O Address DIP Switch is on the endplate of the ISIHI; the IRQ Jumper Block is on the component side of the circuit card, lower middle area.

3. Turn on the PC and start Windows NT4.0.
4. Insert the driver CD-ROM into the CD-ROM drive. (If drivers were obtained from MultiTech web site and stored on diskette, place diskette into floppy drive now.)
5. Click **Start | Settings | Control Panel | Network | Adapters**. Then click **Add**.
6. The **Select Network Adapter** dialog box appears. Click **Have Disk**.
7. The **Insert Disk** dialog box appears. Type or browse for the path (file directory location) of the Windows NT driver (for example, E:\SERVCARD\DRIVERS\WINNT\SETUP.EXE). Click **OK**.
8. The **Select OEM Option** dialog box appears. Click **OK**.

   A transient dialog box will appear indicating the progress of the setup program.
9. The **ISI Cards** dialog box appears. Click **Add**.
10. Then the **ISI Card Settings** dialog box appears. Enter the correct port count:

    • allocate 8 ports for 2S/2U cards;

    • allocate 8 ports for the ISIHP-1S, (even though 4 of those ports will remain unused); and

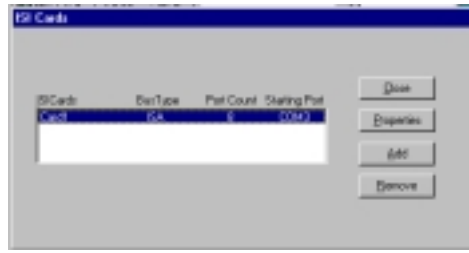
    • allocate 16 ports for 4S/4U/4SD cards.

Select the first port number for ISI devices (TAs or modems), which is usually COM3.

For ISIHI cards, click "ISA" in the **Bus Type** field. Enter the Base I/O Address and IRQ as in Step 2 above.

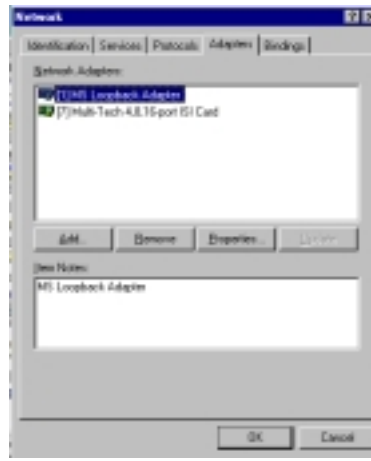
For ISIHP cards, click "PCI" in the **Bus Type** field.

11. The **ISI Cards** dialog box appears again and shows the port resource allocation just made. To add more cards, click **Add** and repeat Step 9.



After the last ISI card has been added, click **Close**.

12. The file is copied and "Multi-Tech ISIHP Adapter" appears in the **Network Adapters** box. Click **Close**.



13. When prompted about restarting your computer, click **Yes**.

The ISIHx card software is now installed in Windows NT.

Installing ISIHx TAs & Modems to COM Ports in Windows NT

To install terminal adapters:

1. In the **Control Panel**, double-click the **Modems** icon.
2. The **Modem Properties** dialog box appears. Click **Add**.
3. The **Install New Modem** dialog box appears. Check the box marked **Don't detect my modem; I will select it from a list** and click **Next**.
4. The **Install New Modem** dialog box appears. In the Manufacturers list, highlight "MultiTech Systems." In the Models list, select an ISDN protocol. The valid choices are:

   ISIHI_HP Auto-Protocol

   ISIHI_HP Auto-Protocol CallBack

   ISIHI_HP PPP async

   ISIHI_HP V.110 async

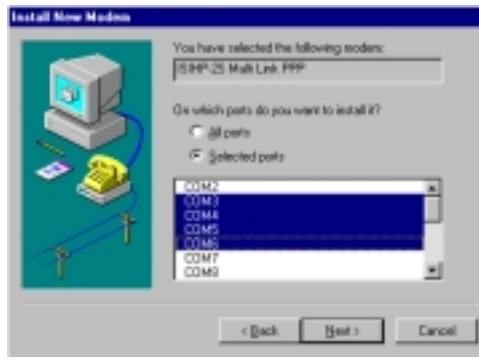
   ISIHI_HP V.120 async

   ISIHI_HP X.75 async

   Click **Next**.

5. The **Install New Modem** dialog box appears. Select the ports that correspond to:
   - the first two ports of the ISIHP-1S card, OR
   - the first four ports of the ISIHP-2S/2U card, OR
   - the first eight ports of the ISIHP-4S/4U/4SD (the 4SD model has no modems).

   Any ports that existed prior to installing the ISIHP appear first in the list of available COM ports. Click **Next**. The terminal adapters (the screen describes them as "modems") will be installed to the selected COM ports.

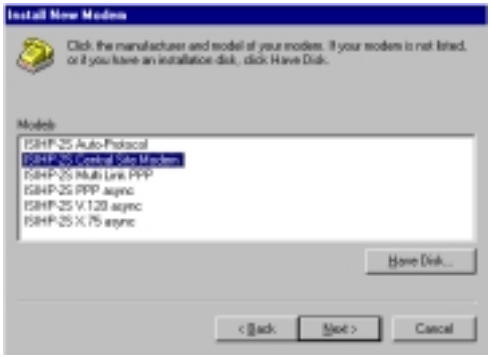


6. After the terminal adapters install, click **Finish** to return to the **General** tab to view COM port assignments (and make changes if necessary). Now you are ready to install the modems.

To install modems: **{does not apply to -4SD}**

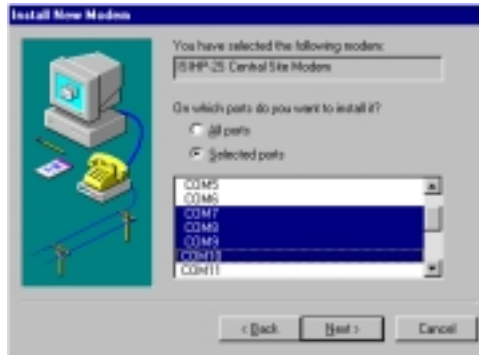
1. In the **General** tab, click **Add**.

2. The **Install New Modem** dialog box appears. Check the box marked **Don't detect my modem; I will select it from a list.** Then click **Next**.
3. The **Install New Modem** dialog box appears. In the **Manufacturers** list, select "MultiTech Systems." From the **Models** list, select **Central Site Modems**. Then click **Next**.

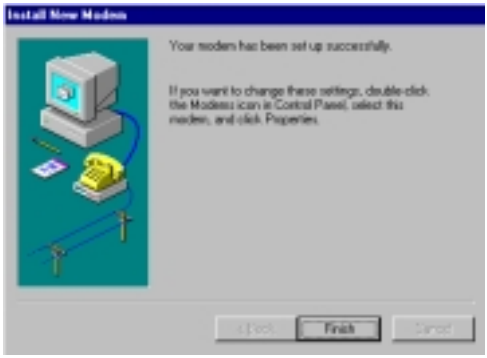

Install New Modem
Click the manufacturer and model of your modem. If your modem is not listed, or if you have an installation disk, click Have Disk.
Models
ISIHP-2S Auto-Protocol
ISIHP-2S Central Site Modem
ISIHP-2S Multi Link PPP
ISIHP-2S PPP async
ISIHP-2S V.120 async
ISIHP-2S X.75 async
Have Disk...
< Back
Next >
Cancel

4. Select ports for modem use.
   - For the ISIHP-2S/2U, you should have reserved 8 ports during driver installation. The first four of these ports should have been assigned as terminal adapters (in the previous procedure). Now select the last four ports, which will be used as modems.
   - For the ISIHP-4S/4U, you should have reserved 16 ports during driver installation. The first eight of these ports should have been assigned as terminal adapters (in the previous procedure). Now select the last eight ports, which will be used as modems.
   - For the ISIHP-1S, you should have reserved 8 ports during driver installation. Recall the port numbers assigned as terminal adapters (for example, COM3 and COM4); skip two port numbers; then assign the next two ports as modems (for example COM7 and COM8).

   Click **Next**. The modems will be installed to the selected COM ports.



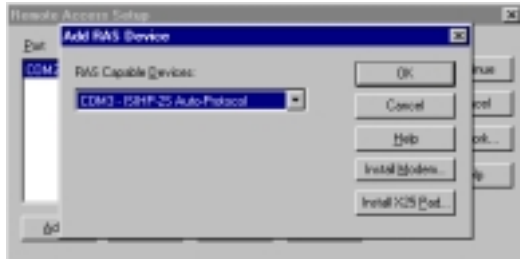
5. After the modems install to the ports, click **Finish** to return to the **General** tab.


Install New Modem
Your modem has been set up successfully.
If you want to change these settings, double-click the Modems icon in Control Panel, select this modem, and click Properties.
< Back
Finish
Cancel

6. To view COM port assignments and make necessary changes, use the **Modem Properties** dialog box.

7. Close the **Modems Properties** dialog box. The message below appears asking if you want to configure dial-up networking. Click **Yes**.

8. The **Remote Access Setup** dialog box appears. Click **Add**.
9. Each COM port appears in a separate **Add RAS Device** dialog box. To add the highlighted device, click **OK**.



10. The **Remote Access Setup** dialog box displays again. Repeat steps 8 and 9 until all devices are added.
11. When all devices have been added, click **Continue**.

12. After the bindings have been reviewed and stored, you will be prompted to restart your computer. Click **Yes**.

You are now ready to configure the terminal adapters.

Removing ISIHx Card and Driver in Windows NT 3.51/4.0

1. Go to **Start | Settings | Control Panel | Network**. Click on the **Adapters** tab.

2. Select "MultiTech 4, 8, 16-port ISI card," and then click **Remove**.

To complete the un-install procedure, restart your computer.

I/O Addresses and IRQ Codes

Unlike the ISIHI, the ISIHP has no DIP switch for I/O addresses and no jumper to determine the IRQ code. The input/output address and the interrupt request code (IRQ) for the ISIHP are assigned automatically during driver installation. During any subsequent re-configuring of your PC, you may need to know the assigned I/O address and IRQ code. To determine the I/O address and IRQ assigned to the ISIHP:

(*for Windows NT*) click on **Start**, **Settings**, **Control Panel** and select the **ISI Cards** icon; *or* click on **Start**, **Programs**, **Administrative Tools (Common)**, **Windows NT Diagnostics**, **Resources**;

Configuring the Terminal Adapter

Introduction

North American users must configure the terminal adapter to match network switch type, the service profile identifier (SPID), and the directory number (DN). For international users, the terminal adapter ships already configured for NET3, which should work on most phone lines in Europe. However, you may want to customize settings, regardless of your location. (See "Optional Settings" below.)

You can configure the terminal adapters with the ISDN TA Configuration utility, ConfigMenu, or with AT commands. Instructions for all three are provided in this manual.

- ***ISDN TA Configuration Utility***—recommended for computers with Windows 95/98/Me, Windows NT, and Windows 2000.
- ***ConfigMenu***—recommended for computers with DOS or Windows 3.x and a VT100/ANSI compatible terminal or data communication program that includes VT100/ANSI terminal emulation.
- ***AT Commands.*** You can use AT commands and S-registers to fine tune TA operation. You enter these commands in your data communication program's terminal mode. AT commands and S-registers are described in detail in a separate chapter of this manual.

North American Users

Before you connect the ISIHI or ISIHP to your network terminator, you must configure it to match the following:

- *Network Switch Type* _____
  Select the network switch type your ISDN service uses at its local central office. You can set the TA to NET3, AT&T 5ESS, NT DMS-100, or US National ISDN-1. If you don't know the switch type, get the information from the local phone company. *AT command:* ***!CO=***
- *SPIDs and DNs* _____
  The TA must be configured with the Service Profile Identifier (SPID). The SPID, assigned by the local phone company, is for the specific BRI line where TA is attached. The SPID field is empty prior to configuration. *AT command:* ***AT!C6=*** *and* ***AT*!C6***

The Directory Number (DN) is the phone number another user would call to contact this TA once it is attached to the ISDN. *AT commands:* ***AT!N1=*** *and* ***AT*!N1=***

Note: *SPIDs only apply for North American switch types.*

International Users

The terminal adapters ship already configured for NET3, which should work for most telephone lines in Europe. If you want to customize settings, refer to the "Optional Settings" below.

Optional Settings

- *Data TEI* _____
  The Data TEI is the TEI (terminal endpoint identifier) assigned to the data channel. You can select *Auto TE*I, a fixed TEI, or *Disable*. A TEI is a number used by the central office switch to uniquely identify each device that is connected to the network. When it uses dynamic TEI assignments (Auto TEI), the central office switch assigns a TEI each time the TA connects to the network. However, the ISDN service provider may assign a fixed TEI at subscription time, in which case you must configure the TA with the fixed TEI number. You also can disable the channel, which may be useful when multiple TAs are attached to a network terminator bus. *AT command:* ***!D3=***

- *Voice TEI* _____
  The Voice TEI is the TEI assigned to the voice channel. You have the same choices as for Data TEI: *Auto TEI*, fixed TEI number, or *Disable*.
  AT command: ****!D3=***

- *Persistent DTR Dialing* _____
  A high DTR (Data Terminal Ready) signal on the serial port indicates that your computer or terminal is ready to communicate with your TA. DTR normally goes high when a communication program starts or is ready to dial. Persistent DTR dialing enables the TA to automatically redial the number stored in memory location 0 whenever DTR is high, and the serial port does not have an active call. You can enable or disable this feature. *AT command:* ***$D***

- *Auto Answer Data Calls* _____ *Rings to Answer* _____
  Select Auto Answer if you want the TA to automatically answer all incoming data calls (option does not affect analog port). The Rings to Answer number (range: 1—255) selects number of rings the TA waits before answering an incoming call. Default: 1 ring. *AT command:* ***S0=***

- *Dialing Method* _____
  Select either the *Enbloc* or the *Overlap* dialing method for use when establishing a data call. Your ISDN provider determines the dialing method. The enbloc method is used for most ISDN dialing; however, you can select the overlap method if you are working with a private network. *AT command:* ***%A97=***

- *Data Protocol* _____
  The data protocol, also known as the B-channel protocol and the rate adaptation protocol, is the *language* spoken over each 64 Kbps channel between two ISDN devices. The devices on both ends of the ISDN link must use identical protocols. *AT command:* ***!Z***

  V.120 Protocol(!Z = 5) —for rates up to 64 Kbps on each B channel.

  PPP Protocol (!Z = 9) —for rates up to 64 Kbps on each B channel.

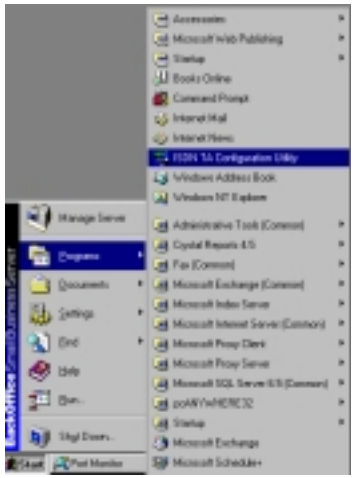
  X.75 Protocol— The ISIHP uses layer 2 of the X.75 protocol as an error correction protocol on the B-channel.

- *Stored Numbers* _____
  The TA can optionally store as many as 10 phone numbers, up to 20 characters each. *AT command:* ***&Z=***

- *Dialing Stored Numbers* _____
  The TA can dial a number previously stored in directory number *n* using the ***&Zn=x*** command. *AT command: e.g.,* ***DS3***

ISDN TA Configuration Utility

1. Make sure Windows NT Remote Access Service (RAS), or any other application that is using the modem, is shut down. To shut down RAS, click **Start**, **Programs**, and then **Administrative Tools (Common)**. Then click **Remote Access Admin** and click **Server**, which will indicate whether or not RAS is running. If it is running, click **Stop Remote Access Service**.
2. Insert the Config Utility diskette into the floppy drive.
3. From the main desktop of your PC, select **Start**, **Settings**, **Control Panel**. Click on the **Add/Remove Programs** icon. Click **Install**.
4. The dialog box **Install Program** from Floppy Disk or CD-ROM appears. Click **Next**. The **Run Installation Program** dialog box appears. Click **Finish**.
5. The Welcome dialog box for the ISDN TA Configuration Utility Setup program appears. Click **Next**.
6. The **Choose Destination Location** dialog box appears.
7. The **Setup** dialog box appears.
8. The **Information** dialog box appears. Click OK.
9. Click **Start**, **Programs**, and then the **ISDN TA Configuration Utility** icon.



10. The **Welcome** dialog box appears. Click **Next.**
11. The **Searching for TA** dialog box appears. Click **Next**.

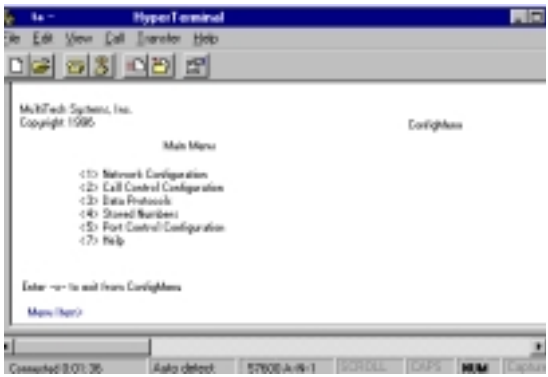
    The next dialog box specifies the TA that has been identified.
12. The **Configuration** dialog box appears. If you have questions about choices, click **Help**. After entering information in each dialog box, click **Next**.
13. The **SPID** dialog box appears (North America only). Referring to your network configuration notes, enter the appropriate information; then click **Next**.
14. The **Data Protocol Setup** dialog box appears. Referring to your network configuration notes, enter the appropriate information; then click **Next**.
15. In the **Save Configuration** dialog box, enter a name to store the configuration. Then click **Next**.
16. To load the configuration, click **Next** in the **Load Configuration** dialog box.
17. Then click **Finish** in the **Configured** dialog box.
18. The first TA now is configured. Click **Back** to return to the **Configuration** dialog box and repeat steps 4 through 9 to configure the remaining TA(s). If you install multiple ISIHI or ISIHP cards in the same PC, you must configure two TAs per 2S or 2U card installed or four TAs per 4S, 4U, or 4SD card. For the ISIHP-1S, you configure only one TA. For example, if you install four ISIHP-2S/2U cards in one PC, you have to configure eight TAs (two per card).
19. After all TAs are configured, close the ISDN TA Configuration utility.

ConfigMenu Configuration Utility

The ConfigMenu configuration utility can be used as another means of configuring the TA. ConfigMenu is installed in the TAs as part of the firmware.

To use ConfigMenu:

1. Start a data communication program and select the COM port where the TA is connected.
2. In the communication program dialog box, type **AT@CONFIG** and press ENTER. ConfigMenu's **Main Menu** appears (see screen below).



3. To select menu item, type its number and press ENTER. A submenu then appears where you can make selections. At the lowest level, you can change a configuration option by selecting a number or typing a value and pressing ENTER.
4. When you finish, close ConfigMenu by typing **x**□□and pressing ENTER.
5. You will be prompted to decide whether to save the configuration when you exit the ConfigMenu program. Type **y**□□to have ConfigMenu automatically save the configuration.

ConfigMenu Menus

Network Configuration Menu—configures network parameters such as switch type, data and voice TEIs, and data and voice MSNs. When you finish, select *Save Network Configuration* to save your work.

Call Control Configuration Menu—changes how the TA originates and answers calls. Options include Auto Answer, Rings to Answer, Dialing Method, and Persistent DTR Dialing.

Data Protocol Menu—changes rate adaption protocol used by the TA.

Stored Numbers Menu—stores up to ten phone numbers (maximum of 20 characters each). Stored number 0 is the phone number that will be dialed if persistent DTR dialing is enabled.

Port Control Configuration Menu—configures TA's serial port, including how TA responds to control signals on the serial interface.

Help Menu—provides assistance in navigating through the TA menu system or viewing the firmware version numbers of the ISIHI or ISIHP card.

Terminal Adapter AT Commands

You can configure the terminal adapters using AT commands just as you would configure an analog modem. Use this method if you prefer to work with AT commands or if you have a special requirement not addressed by either of the configuration utilities.

To configure the TAs with AT commands:

1. Start a data communication program and select the TA COM ports to be configured.
2. Referring to records made for your system, enter AT commands in the terminal window of the data communications program.
3. When you finish, use the ***&W*** command to save your new configuration and to select it to load automatically when the ISIHP is turned on.
4. Close the data communications program. For more information, see the chapter on *AT Commands and S-Registers* in this manual.

NetWare Driver Installation

Multi-Tech Systems provides AIO drivers for the ISIHx cards, so they can function with Novell compatible asynchronous applications (e.g., NetWare Connect). The AIO driver is simply an NLM (NetWare Loadable Module) that runs on the file server. Drivers must be loaded on the file server where the board is installed. Drivers can be loaded from the file server's console prompt or incorporated for autoloading in the AUTOEXEC.NCF file.

The file AIOMTS.MDC contains Novell (version 3.12 and higher) initialization strings for ISI products not previously listed for use with BorderManager and Netware Connect. The file AIOMTS.MDC is included on the ISI Product Family CD. To benefit from the AIOMTS.MDC file, you must copy it from the CD to the appropriate directory on your computer.

To use AIOMTS.MDC under Border Manager, RAS, NIAS in 4.2 or 5.x:

Copy AIOMTS.MDC to your System directory.

To use AIOMTS.MDC under Novell NetWare 3.x, 4.1, 4.11 with NetWare Connect 2.0.28 or higher:

Copy AIOMTS.MDC to your System and System/AIO directory.

To install the Multi-Tech AIO driver, copy the file *AIOISIX.NLM* to the system directory of the file server from a workstation on the network. To copy, you can use the following command:

COPY E:\SERVCARD\DRIVERS\NOVELL\AIOSIX.NLM F:\SYSTEM

If you have downloaded the ISI driver from the MultiTech web site onto a diskette, use this command:

```
COPY A:\NOVELL\AIOISIX.NLM  F:\SYSTEM
```

To load the driver, go to the system or PC console (where the ISI card is installed) and enter the following at the prompt:

```
   LOAD AIOISIX [port=W] [interrupt=X] [name=Y]
[note=Z]
```

For PCI-bus cards (ISIHP models) Netware will set up the interrupt (IRQ) and I/O address automatically.

To install the ISI card scripts, copy **aiomdms.mdc** to **f:\system\aio\directory**. Click **Yes** to overwrite the existing aiomdms.mdc file.

Configuring Ports for NetWare Connect

When the driver is installed, it will allocate consecutive ports for the ISI card as follows:

• 16 consecutive ports for the ISIHP-4S/4U/4SD. Note that, for the ISIHP-4SD, only 8 of these ports will be used; the other 8 ports will be considered "broken." After installation of the ISIHP-4SD is complete, the "broken" ports can be allocated to a different purpose.

• 8 consecutive ports for the ISIHI-2S/2U or ISIHP-2S/2U

• 8 consecutive ports for the ISIHP-1S. However, upon inspection, the Netware OS will initialize the first pair of ports (terminal adapters), label the second pair of ports "broken," initialize the third pair of ports (modems), and label the fourth pair "broken." After installation of the ISIHP-1S card is complete, the "broken" ports can be allocated to a different purpose.

To set up NetWare Connect ports, enter **`LOAD NWCCON`** at the NetWare console prompt. LOAD NWCCON opens the NetWare Connect Configuration Utility. Select the appropriate menu options (modem type, speed, flow control, etc.).

Removing the Driver (Novell)

In Novell, remove file AIOISIX.NLM from the system directory and make the appropriate changes to the *Autoexec.ncf* file.

SCO Open Server 5 Driver Installation

The ISI driver for SCO Open Server 5 is shipped on CD-ROM (FAT file system) and can also be downloaded from the Multi-Tech web site. In both cases, the driver files are compressed ("tarred"). Users installing from the CD-ROM should begin at "To install from CD-ROM" directly below. Users installing from a floppy disk should skip down to "To install driver from floppy disk" later in this section. The filename of the SCO5 driver in its tarred form is **sco50x.tar**.

This present installation section is task-oriented with minimal explanation of procedural steps. The section *Multi-Tech Installation Script,* which immediately follows this section, presents additional details to aid in installation.

To install from CD-ROM:

```
# mount -r /dev/cd0 /mnt
# cd /mnt
# cd servcard/drivers/sco50x
#cp sco50x.tar /
# cd <ENTER>
```

To format a floppy disk for SCO5:

1. At the Unix prompt, run the **scosh** program.
2. Select **Manager**.
3. Select **Archive**.
4. Select **Format**.
5. Make sure that Device is pointed to the floppy drive.
6. Select **Continue**.

To untar the driver file and copy files onto floppy disk:

1. Make a temporary directory for the ISI driver files.

```
# mkdir /isi
```

2. Copy the tarred isi driver file into the temporary directory.

```
# cp sco50x.tar /isi
```

3. Untar this file and put its contents into the temporary directory.

```
# cd /isi
# tar xvf sco50x.tar
```

4. Copy the untarred (inflated or non-compressed) files to a floppy disk

```
# cd /isi/unifiedinstimg301
#scosh
```

- Select **Manager**.
- Select **Archive**.
- Select **Create**.
- Press space bar to highlight tmp/ and usr/ directories.
- Press <ENTER> to copy.
- Make sure Device is pointed to the floppy disk.
- Make sure that the "Type" is cpio.
- Select **Continue**.

5. To verify that the files have been copied onto the floppy disk, use these commands:

```
# scosh
```

- Select **Manager**.
- Select **Archive**.
- Select **List**.
- Make sure Device is pointed to the floppy disk.
- Select **Continue**.

To install driver from floppy disk

(Users starting with the untarred SCO5 driver on a floppy disk can begin the installation here).

1. Run the **custom** utility.

2. Select **Software**.

3. Select **Install New**.

4 Highlight driver file from local host and select **Continue**.

5. Select as the Media Device "Floppy Disk Drive."

6. Select .

7. Highlight "Multi-Tech ISA/PCI ..." and select **Install**.

8. Enter **Y** (yes) to continue installing the ISI driver.

9. As many as four ISI cards can be installed in the server.

9a. If you are installing an ISIHP card, type `0` (that is, zero).

9b. If you are installing an ISIHI card, type `1, 2, 3,` or `4`, based on the number of ISIHI cards you are installing in your system. Type the base I/O address and the IRQ value for each card. Be sure that the I/O address and the IRQ value match the values set in the DIP switch and jumper block on the ISIHI card.

For further details see *MultiTech Installation Script* step 1.

10. Type the number of pseudo-devices to be created.
For the ISIHP-1S, type `4`.
For the ISIHP2S/2U/4SD and ISIHI-2S/2U, type `8`.
For ISIHP-4S/4U, type `16`.

For further details see *MultiTech Installation Script* step 2.

11. Type **Y** (yes) to accept the prefix for tty ports. For further details see *MultiTech Installation Script* step 3.

12. Type **Y** (yes) to confirm the selection. For further details see *MultiTech Installation Script* step 4.

13. After the driver is installed, press ENTER to continue. For further details see *MultiTech Installation Script* step 4(last paragraph) and step 5.

14. Exit the **custom** utility. For further details see *MultiTech Installation Script* step 6.

15. Remove the floppy disk and reboot your computer. For further details see *MultiTech Installation Script* step 7.

MultiTech Installation Script

The Multi-Tech Installation Script for SCO Open Server 5 systems requests information about how many boards you want to install, designations for communication ports and printer ports, and how many pseudo devices you want to create for Multi_View utility. Based on this information, the appropriate driver files will be installed and linked with your system's kernel.

1. This text appears on the screen:

   ```
   You can install up to 4 ISA/PCI cards in a
   system. The PCI cards will be autodetected on
   bootup. Enter the number of ISA cards you
   want to install and configure on your system
   (0-4):
   ```

   Select **0** (that is, zero) if your computer has a PCI bus. This tells the SCO operating system to autodetect the ISI cards.

2. The following text appears on the screen:

   ```
   Multi_View is a utility which will allow you
   to have multiple sessions on terminals that
   have multiple pages of physical memory.  In
   order for this utility to work with
   MultiTech's serial cards, pseudo devices have
   to be created in your /dev directory.  These
   devices are system-wide resources.

   Enter the number of pseudo-devices to be
   created for the use of Multi_View utility
   (1 - 256).
   ```

The Multi_View utility initializes the multiple-page capability of terminals with multiple pages of memory. The number specified here is the total number of devices (between 1 and 256) available to all Multi-Tech terminals and it's the number of pseudo devices available to the Multi_View utility.

Specify **8** pseudo devices for each ISIHx-2S or -2U card installed; specify **16** for each ISIHP-4S or -4U card installed; specify **8** devices for each ISIHP-4SD card installed. For example, if the computer contains three ISIHP-4S cards, you would enter **48**.

The ISIHP-1S card is a special case. In the MultiTech Installation Script, you should specify 8 pseudo devices for the ISIHP-1S card. However, only four of these pseudo devices will actually be used. The first pair, `ttyl1A` and `ttyl1B`, will be used as terminal adapters; the third pair, `tty11E` and `tty11F`, will be used as modems. (In device names like `ttyl1A`, the fourth character is a lower-case "L"; the device names are, however, case sensitive.) The remaining ports (the second pair and the fourth pair) are not used and can be allocated to a different purpose after the ISIHP-1S installation is complete. You must initialize each of the four ports separately using the **enable** command (for example, `enable ttyl1a`).

The ISIHP-4SD is also a special case. In the MultiTech Installation script, you should specify 16 pseudo devices for the ISIHP-4SD card. However, only the first 8 devices (`ttyl1A` through `ttyl1H`) will be used and these will be used as terminal adapters. The remaining ports (`ttyl1J` through `ttyl1P`) are not used and can be allocated to a different purpose after the ISIHP-4SD installation is complete. Use the **enable** command to initialize ports.

3. This text appears on the screen and relates to the "/dev" directory.

```
This script also creates the devices in your
system to communicate with the ports of
ISICOM.  The default prefix for the tty ports
is ttyl□  The default prefix for the printer
is prnl.  Is this acceptable? (y/n/q).
```

For most users, it's best to select **y**, which entails accepting the default values. Then proceed to step 4.

Details for use of non-default port/printer values. The /dev directory holds device-information files used by the kernel to access the hardware. When you add an ISI card, you must give the ISI ports unique names so they do not conflict with existing ports or with other devices known to your system. If a device name has already been assigned to an existing device and the operator assigns that name to a new device, then the existing device will be *deleted* when the ISI port using its name is created.

a. To use a non-default base name, type **N** and then enter a basename having less than five characters. The base name you select will be used for all ports on each card you install. ISI port designations will have this form:
[*basename prefix*][*board number*][*port letter*].

basename: Length is one to four characters.
board number: Values will be 1, 2, 3, or 4, depending on how many ISI cards are installed in your computer.
port letter: For ISIHx-2S/2U, use letters A through D for TAs; use letters E through H for modems. For ISIHx-4S/4U, use letters A through H for TAs; use letters I through P for modems. (For terminal control devices, use lower-case letters as port identifiers.)

Device basename selected: _____

b. After you select a device basename, you are prompted for a printer base name. This prefix identifies each port that supports a terminal with a printer attached to its auxiliary port (for transparent printing). Specify a unique printer base name (printer parameters are outlined in the Multi_Setup Utility section in this manual).

Printer base name selected: _____

When you have specified the device base name and the printer base name, press ENTER to continue.

4. The confirmation screen lists the values you have selected. The following text appears on the screen (default values are shown):

```
You have chosen the following setup
The tty ▫▫▫▫▫▫▫▫▫▫ttyl▫
The printer prefix is prnl▫
Number of Multi_View pseudo devices
[user-specified number].
```

If these values are correct, type **Y** and the installation process will continue. If there is an error in any of the values displayed, type **N** and the first screen displays. Then re-enter the information for each card.

When you accept the confirmation list (by typing **Y**), a series of messages displays while the driver is being installed and the kernel rebuilt. After the terminals have been added to the Terminal Control database, and when the display says "**Press <Enter> to continue**:", then press ENTER. When **Installation complete** displays, press ENTER again.

5. Select **Host** and press ENTER . Remove the diskette from the drive.
6. Select **Exit** and press ENTER .
7. To reboot the system (required), enter the following commands:

   Type **shutdown -g0-y** and press ENTER

   OR

   Type **init 6** and press ENTER .

Driver installation for the ISIHP card now is complete.

Activating Ports in SCO Open Server 5

SCO Open Server 5 provides a device database that monitors the activity of serial ports through which users can log onto the host. If your ISI ports are used by terminals (e.g., to allow users to log onto your host), you must create an entry in the system's device database that furnishes specific information for the terminals that will be used on each ISI port. The database is referenced each time a user attempts to log in. If there is no database entry for a particular terminal, access to the host is denied.

1. Turn on your system and verify that the firmware for each ISIHP loads successfully. If the firmware for a given ISIHP or ISIHI card

does not load, none of its ports will be accessible. (If this happens, see *Multi-Tech's Administrative Utility* section in this manual.)

2. Type the complete name of the first device you want to create in **`usr/lib/uucp/Devices`**. Substitute the specific base name, board number, and port letter for the generic parameters in the expression **`ttylbx`**. Use a lower-case **`x`** value for local DTE (terminal) support and an upper case **`X`** value for modem control for each port you want to enable. Example: **`ttyl2A`** denotes the second ISI card (2) and the first port on that card (A). The port status can be altered later, but one setting must be selected at this time. The ACU line would read as follows: **`ACU ttylbX - 9600 dialer name`**. Replace **`b, X␣`** and **`dialer-name`** with appropriate values.
3. Repeat this process for each port on each board you have installed. **Record the setting you select for each port.**
4. Using device names created in the previous section, type the following command for each port you want to activate: **`enable ttylbx`**
5. Repeat this command for each port you want to activate, using the lower case letter for local terminal use or upper case for modem control.

Note: *Only one of the options (e.g., modem control or local terminal access) should be enabled for any port at one time. For example, you cannot enable* `ttyl1a` *and then enable* `ttyl1A`*. To change the status of a port, disable the current status (*`disable ttyl1a`*) and then enable it for the desired status (*`enable ttyl1A`*).*

Removing the Driver (SCO Open Server 5)

To remove the Multi-Tech Serial Card Driver, enter the configuration utility (e.g., custom for SCO Open Server 5) and follow instructions to remove the entire driver and rebuild the kernel without the ISI driver. If it is necessary to reinstall the driver due to I/O address or IRQ overlap, remove the driver first.

Note: Remove the driver before permanently removing the ISI card from the computer.

Linux Driver for Multi-Tech ISI Server Cards (for PCI and ISA busses)

This is the standard installation procedure for Linux and is applicable to all Linux operating systems of the correct kernel level (2.0, 2.2, or 2.4). The next major section of this manual, *RedHat Linux 6.2/7.0 RPM Drivers for ISI Server Cards (PCI bus only)*, is an alternative installation procedure applicable only to RedHat Linux 6.2 and 7.0 using the RedHat Package Management System (RPM). Note that RedHat Linux versions 6.2 and 7.0 both use the Linux 2.2 kernel and the applicable ISI driver can be installed using this standard installation procedure, as well.

LINUX: Pre-Installation Issues

When unpacking the Linux driver, there are two choices, one driver for the 2.0.x kernel (at this writing, it is filename L300_20X.TAR), and one driver that works for both the 2.2.x kernel and the 2.4.x kernel (at this writing, it is filename L305_22X_24X.TAR). Be absolutely positive about which kernel you have! Note that updated driver files may be issued from time to time.

The 'make' utility, GNU C compiler, and the kernel sources need to be installed on your system. If any of these are missing, the compilation will fail. Most later Linux OSs install these elements automatically .

LINUX: Copying the driver from the media

The Linux drivers (for 2.0 and 2.2/2.4 kernels) are shipped in compressed ('tarred') form on a CD-ROM formatted with the FAT file system. In some cases, users may download Linux ISI drivers from the MultiTech web site onto diskette (in ext2 format). We present instructions for both situations below.

LINUX: Copying & untarring the driver from CD-ROM

1. Mount the CD-ROM using this command:

```
mount /mnt/cdrom
```

2. Change directory

```
cd /mnt/cdrom
```

3. List the files on the CD-ROM and locate the directory for the kernel in use (2.0 or 2.2/2.4), using this command

```
ls
```

4. Untar the appropriate Linux driver using this command:

```
> tar vxf {filename}/isi
```

At this writing, the filename will be either L300_20X.tar (for 2.0 kernel) or L305_22X_24X.TAR (for 2.2/2.4 kernel).

LINUX: Copying & untarring the driver from a floppy

The ISI driver *.tar* file can be copied from a DOS formatted floppy using the 'mcopy' command if the 'mtools' have been installed. Issue `'mcopy a:isilinux.tar <destination folder>'` to copy the isilinux.tar (or current driver name) file to the destination folder. As an alternative, the floppy can be manually mounted and the file copied to the required destination folder.

NOTE: To read from a DOS formatted floppy, a kernel with support for the FAT file system (either statically linked in the kernel or as modules) is required.

Steps for copying the driver from a floppy:

1. Linux floppy disks are in ext2 format.
2. Insert Linux driver in drive A: and mount floppy drive.

```
> mount -t ext2 /dev/fd0 /mnt/floppy
```

3. Copy files from floppy to a temporary directory on hard drive.

```
> mkdir /isi
> cd /isi
> cp /mnt/floppy/kernel_2.2.x/*  /isi
```

After you have copied the installation tar file to a folder, use the command `'tar xvf isilinux.tar'` to untar (unzip or de-compress) the installation files in that folder.

LINUX: Driver installation and loading

Execute the 'Install' script to build the driver and to copy the driver and firmware files to the required folder.

```
> cd /isi
> ./Install
```

For ISI cards with the ISA bus, the installation script requires the user to type in the I/O address and the IRQ to be used. For ISI cards with the PCI bus, simply press ENTER when asked for addresses and IRQs. The installation creates the script file 'ISICOMStart' in the destination folder. 'ISICOMStart' automates the loading process for the driver and firmware.

To view busy I/O address space on your system, enter

cat/proc/ioports

To view busy IRQs, enter:

cat /proc/interrupts

You must load the driver before you can load the firmware. You can load the driver manually using the 'insmod' utility. For ISI cards with the ISA bus, the I/O base address and the IRQ required by the card also need to be passed as parameters to insmod (this does not apply to ISI cards with the PCI bus).

```
insmod isicom io=card1, ... card4 irq=card1,
... card4
```

The PCI cards and their configurations will be auto-detected by the driver.

You can manually load the firmware into all of the installed ISI cards simultaneously by executing the 'frmld' utility in the installation folder. The firmware to all the installed cards can be manually loaded by executing the 'firmld' utility in the installation folder. This utility requires the firmware files (.bin) to be located in the /usr/local/ ISICOM/ folder.

LINUX: Setting the baud rate

The 'stty' utility can be used to set the baud rate of a particular port. For example, to set the baud rate of the first port on the first card (ttyM1a) to 38400 bps, execute `'stty 38400 < /dev/ttyM1a'`.

The current baud rate can be viewed by executing `'stty < /dev/ttyM1a'`.

LINUX: Verifying the ports

Terminal utilities like 'minicom' can be used to verify the ports, 'talk' to the modem, and dial out.

To configure 'minicom' for a particular port, run it with the '-s' option. In the 'serial port setup' menu option, set the serial device to the required ISI port device (for example, '/dev/ttyM1a' for the first port on the first card). Save the configuration for a particular port using the 'save setup as' menu option as, for example, '1a' for the port /dev/ttyM1a. To connect the next time to the port /dev/ttyM1a using minicom, 'minicom 1a' needs to be executed.

LINUX: TTY Devices Created by the Drivers:

Device files corresponding to ports on the ISI card are created in the ▫▫▫▫ folder. Use **`ttyMxy`** for normal ports and **`cumxy`** for corresponding callout ports. Normal ports (**`ttyM`**) are configured for dial-in connections. Callout ports (**`cum`**) are used for dial-out connections.

In these expressions (**`ttyMxy`** and **`cumxy`**), the letter **`x`** is the card number (1-4), and **`y`** is the port designator (a, b, c, ...).

The ISI Linux driver creates the following TTY devices in /dev directory:

- `/dev/ttyM1a TO /dev/ttyM1p` for the first ISI card
- `/dev/ttyM2a TO /dev/ttyM2p` for the second ISI card
- `/dev/ttyM3a TO /dev/ttyM3p` for the third ISI card
- `/dev/ttyM4a TO /dev/ttyM4p` for the fourth ISI card

For 4-port cards, it uses the following:

- `/dev/ttyM1a TO /dev/ttyM1d` for the first ISI card
- `/dev/ttyM2a TO /dev/ttyM2d` for the second ISI card
- `/dev/ttyM3a TO /dev/ttyM3d` for the third ISI card
- `/dev/ttyM4a TO /dev/ttyM4d` for the fourth ISI card

For 8-port cards, it uses the following:

- `/dev/ttyM1a TO /dev/ttyM1h` for the first ISI card
- `/dev/ttyM2a TO /dev/ttyM2h` for the second ISI card
- `/dev/ttyM3a TO /dev/ttyM3h` for the third ISI card
- `/dev/ttyM4a TO /dev/ttyM4h` for the fourth ISI card

For 16-port cards, it uses the following:

- `/dev/ttyM1a TO /dev/ttyM1p` for the first ISI card
- `/dev/ttyM2a TO /dev/ttyM2p` for the second ISI card
- `/dev/ttyM3a TO /dev/ttyM3p` for the third ISI card
- `/dev/ttyM4a TO /dev/ttyM4p` for the fourth ISI card

The ISIHP-1S is a special case. It is treated as an 8-port card with only four ports in use. As an example, consider an ISIHP-1S that is the first expansion serial card in the computer. Ports **`ttyM1a`** and **`ttyM1b`** are terminal adapter ports; ports **`ttyM1e`** and **`ttyM1f`** are modem ports. Ports **`ttyM1c`**, **`ttyM1d`**, **`ttyM1g`**, and **`ttyM1h`** are unused and can be allocated to a different purpose after the ISIHP-1S installation is complete.

Devices mapped for Hybrid cards (ISIHI-xx and ISIHP-xx cards):

For the 2-BRI hybrid cards (8 ports; ISIHI-2S/2U and ISIHP-2S/2U)

- `/dev/ttyM1a` to `/dev/ttyM1d` *for ISDN ports.* (*These four ports correspond to the total of four B-channels available on the two BRI lines that can be connected to these cards.*)

- `/dev/ttyM1e` to `/dev/ttyM1h` *for modem ports.* (*These four ports accommodate the total of four 56K modems that can operate on the four B-channels available on the two BRI lines that can be connected to these cards.*)

For the 4-BRI hybrid cards (16 ports; ISIHP-4S/4U/4SD):

- `/dev/ttyM1a` to `/dev/ttyM1h` *for ISDN ports*. (*These eight ports correspond to the total of eight B-channels available on the four BRI lines that can be connected to these cards.*)

- `/dev/ttyM1i` to `/dev/ttyM1p` *for modem ports*. (*For the ISIHP-4S/4U, these eight ports accommodate the total of eight56K modems that can operate on the eight B-channels available on the four BRI lines that can be connected to these cards. Note, however, that this device mapping for ttyM1i through ttyM1p does not apply to the ISIHP-4SD. This is because the ISIHP-4SD works with ISDN ports, or terminal adapter ports, only. The ISIHP-4SD contains no modems in its circuitry.*)

LINUX -- Dial-in configuration:

To configure a particular port for dial-in, utilities like 'mgetty' need to be installed on the system. If, for example, the port /dev/ttyM2c needs to be configured for a remote-access dial-in connection, an entry of the form 'M2c:12345:respawn:/sbin/mgetty ttyM2c' needs to be added in the /etc/inittab file. After you have made the change, execute 'init q' so that the 'init' process re-reads the inittab file and spawns the mgetty process to wait for an incoming connection. Users can then dial in, use their user names and passwords to log in, and access their accounts on the machine.

To disable dial-in access on a particular port, change the entry in the /etc/inittab file to `'M2c:12345:off:/sbin/mgetty ttyM2c'` or just comment-out that entry by prefixing a '#' to the entry on the line.

LINUX -- PPP setup:

The 'PPP-HOWTO' (a document that is available as a part of the 'HOWTO' documentation on most of the distributions under /usr/doc/HOWTO) explains in detail the procedure for configuring a Linux machine as a PPP server. This information is also available at

http://www.interweft.com.au/other/ppp-howto/ppp-howto.html.

The documentation in the PPP-HOWTO is directly applicable to ISI ports.

Note: *A base I/O address of 0, e.g., ISIBaseX=oxo, or omission of these parameters for any card X, disables that particular card.*

Miscellaneous:

Device files corresponding to ports on the ISIHP cards are created in the **/dev** folder. Use **`ttyMxy`** for normal ports and **`cumxy`** for corresponding callout ports. The letter **x** is the card number (1–4), and **y** is the port number, (a–p) for 16-port cards.

Normal ports (**ttyM**) are configured for dial-in connections. Callout ports (**cum**) are used for dial-out connections.

To view busy I/O address space on your system, enter:

```
cat /proc/ioports
```

To view busy IRQs, enter:

```
cat /proc/interrupts
```

To load the driver manually, use **`insmod`**.

Example: To load two ISI cards configured with base I/O addresses 0x210 and 0x200 and IRQs 5 and 10, enter the following in the destination folder:

```
insmod isicom
ISIBase1=0x210
Irq1=5
ISIBase2=0x200
Irq2=10
```

To remove the driver manually, enter **`rmmod isicom`**. This removes the driver only if no ISI ports are in use.

Removing the ISI Driver (Linux)

1. Type `cd /usr/local`. Press ENTER.
2. Type rm `-r ISICOM`. Press ENTER.
3. This will remove driver for all ISIHx cards in that Linux server.
4. Remove the isictl file by typing "`rm isictl`" in the /dev directory.
5. Remove all devices that start with ttyM1x, ttyM2x, ttyM3x and ttyM4x in the /dev directory.

   "`rm ttyM1*`"
   "`rm ttyM2*`"
   "`rm ttyM3*`"
   "`rm ttyM4*`"

RedHat Linux 6.2/7.0 RPM Drivers for ISI Server Cards (PCI bus only)

This installation procedure applies only to RedHat Linux versions 6.2 and 7.0 and only when used with ISIH**P** server cards, that is, those with the PCI bus. The standard Linux installation procedure ("Linux Driver for Multi-Tech ISI Server Cards (for PCI and ISA busses)") still applies to all use of Linux in ISIHI and ISIHP server cards. (Note that RedHat Linux versions 6.2 and 7.0 both use the Linux 2.2 version kernel.)

LINUX-RPM: Pre-Installation Issues

The 'make' utility, GNU C compiler, and the kernel sources need to be installed on your system. If any of these are missing, the compilation will fail. Most later Linux OSs install these elements automatically .

LINUX-RPM: Copying the driver from the media

The RedHat Linux RPM drivers are on the ISI-Family Installation CD-ROM in separate directories, ServCard/Drivers/Linux/RPMS/70RPM for version 7.0 and ServCard/Drivers/Linux/RPMS/62RPM for version 6.2. In some cases, users may download RPM drivers from the MultiTech web site onto diskette (in ext2 format). We present instructions for both situations below.

LINUX-RPM: Copying the driver from CD-ROM

1. Mount the CD-ROM using this command:

```
mount -r /dev/cdrom /mnt/cdrom
```

2. Change directory

```
cd /mnt/cdrom
```

3. List the RPM files on the CD-ROM using this command:

```
ls
```

LINUX-RPM: Copying the driver from a floppy

The ISI driver *.rpm* file can be copied from a DOS formatted floppy using the 'mcopy' command if the 'mtools' have been installed.

For RPM version 6.2, issue the command '`mcopy a:isicom-1.1-3.src.rpm <destination folder>`' to copy the isicom-1.1-3.src.rpm (or current driver name) file to the destination folder.

For RPM version 7.0, issue the command '`mcopy a:isicom-1.2-3.src.rpm <destination folder>`' to copy the isicom-1.2-3.src.rpm (or current driver name) file to the destination folder.

As an alternative, the floppy can be manually mounted and the file copied to the required destination folder.

NOTE: To read from a DOS formatted floppy, a kernel with support for the FAT file system (either statically linked in the kernel or as modules) is required.

Steps for copying the driver from a floppy:

1. Linux floppy disks are in ext2 format.
2. Insert Linux driver in drive A: and mount floppy drive.

```
> mount -t ext2 /dev/fd0 /mnt/floppy
```

3. Copy files from floppy to a temporary directory on hard drive.

```
> mkdir /isi
> cd /isi
```

4. The current isicom.o file should be backed up before installing the RPM. The easiest way is simply to rename it or copy it into another file. For example, "`cp` (or `mv`) `isicom.o isicom.original`". It is usually located in the /usr/local/ISICOM directory. For the version 7 RPM, you will need to use the '--force' option in the RPM command as in step 5b below.

5a. For RPM version 6.2:

Copy the RPM to a temporary folder. In this example, we'll use /isi. Installation is in three parts, building the 'isicom-smp.spec' file from the source file, then building the actual RPM from that "spec" file, and finally, installing the RPM. Do not type the quotation marks shown in the commands below.

- Run "`rpm -i /isi/isicom-1.1-3.src.rpm`".

- Run "`rpm -ba /usr/src/redhat/SPECS/isicom-smp.spec`".

- Run "`rpm -ihv /usr/src/redhat/RPMS/i386/isicom-1.1-3.i386.rpm`"

- Reboot the system, either using the command "`init 6` <ENTER>" or your favorite method.

5b. For RPM version 7.0:

Copy the RPM to a temporary folder. In this example, we'll use /isi. Installation is in three parts, building the 'isicom-smp.spec' file from the source file, then building the actual RPM from that "spec" file, and finally, installing the RPM. Do not type the quotation marks shown in the commands below. Replace the x below with the actual version numbers being used.

- Run "`rpm -i /isi/isicom-1.2-3.src.rpm`".

- Run "`rpm -ba /usr/src/redhat/SPECS/isicom-rh7.spec`".

- Run "`rpm -ihv --force /usr/src/redhat/RPMS/i386/isicom-1.2-3.i386.rpm`".

- Reboot the system, using either the command "`init 6` <ENTER>" or your favorite method.

LINUX-RPM: Verifying the ports

To test the installation, you can use the terminal program 'minicom'. Use the command "minicom -s" to set up the tty port that you will use to communicate.

1. In the **Configuration** window, select "Serial Port Setup."
2. Select **A** to set the Serial Device (for example, /dev/ttyM1a).
3. Select **E** to set the baud rate.
4. Press Escape (**Esc**) to exit.
5. Select **Exit** to communicate with the port.
6. Issue AT commands and make sure it returns "OK".

LINUX-RPM: TTY Devices Created by the Drivers

Device files corresponding to ports on the ISI card are created in the ▫▫▫▫ folder. Use ▫▫▫▫▫▫ for normal ports. Normal ports (**ttyM**) are configured for dial-in connections.

In these expressions (**ttyMxy**), the letter **x** is the card number (1-4), and **y** is the port designator (a, b, c, ...).

The ISI Linux driver creates the following TTY devices in /dev directory:

- `/dev/ttyM1a` TO `/dev/ttyM1p` for the first ISI card
- `/dev/ttyM2a` TO `/dev/ttyM2p` for the second ISI card
- `/dev/ttyM3a` TO `/dev/ttyM3p` for the third ISI card
- `/dev/ttyM4a` TO `/dev/ttyM4p` for the fourth ISI card

For 4-port cards, it uses the following:

- `/dev/ttyM1a` TO `/dev/ttyM1d` for the first ISI card
- `/dev/ttyM2a` TO `/dev/ttyM2d` for the second ISI card
- `/dev/ttyM3a` TO `/dev/ttyM3d` for the third ISI card
- `/dev/ttyM4a` TO `/dev/ttyM4d` for the fourth ISI card

For 8-port cards, it uses the following:

- `/dev/ttyM1a` TO `/dev/ttyM1h` for the first ISI card
- `/dev/ttyM2a` TO `/dev/ttyM2h` for the second ISI card
- `/dev/ttyM3a` TO `/dev/ttyM3h` for the third ISI card
- `/dev/ttyM4a` TO `/dev/ttyM4h` for the fourth ISI card

For 16-port cards, it uses the following:

- `/dev/ttyM1a` TO `/dev/ttyM1p` for the first ISI card
- `/dev/ttyM2a` TO `/dev/ttyM2p` for the second ISI card
- `/dev/ttyM3a` TO `/dev/ttyM3p` for the third ISI card
- `/dev/ttyM4a` TO `/dev/ttyM4p` for the fourth ISI card

The ISIHP-1S is a special case. It is treated as an 8-port card with only four ports in use. As an example, consider an ISIHP-1S that is the first expansion serial card in the computer. Ports **ttyM1a** and **ttyM1b** are terminal adapter ports; ports **ttyM1e** and **ttyM1f** are modem ports. Ports **ttyM1c**, **ttyM1d**, **ttyM1g**, and **ttyM1h** are unused and can be allocated to a different purpose after the ISIHP-1S installation is complete.

Devices mapped for Hybrid cards (ISIHP-xx cards):

For the 2-BRI hybrid cards with PCI bus (8 ports; ISIHP-2S/2U)

- `/dev/ttyM1a` to `/dev/ttyM1d` *for ISDN ports.* (*These four ports correspond to the total of four B-channels available on the two BRI lines that can be connected to these cards.*)

- `/dev/ttyM1e` to `/dev/ttyM1h` *for modem ports.* (*These four ports accommodate the total of four 56K modems that can operate on the four B-channels available on the two BRI lines that can be connected to these cards.*)

For the 4-BRI hybrid cards (16 ports; ISIHP-4S/4U/4SD):

- `/dev/ttyM1a` to `/dev/ttyM1h` *for ISDN ports.* (*These eight ports correspond to the total of eight B-channels available on the four BRI lines that can be connected to these cards.*)

- `/dev/ttyM1i` to `/dev/ttyM1p` *for modem ports.* (*For the ISIHP-4S/4U, these eight ports accommodate the total of eight56K modems that can operate on the eight B-channels available on the four BRI lines that can be connected to these cards. Note, however, that this device mapping for* `ttyM1i` *through* `ttyM1p` *does not apply to the ISIHP-4SD. This is because the ISIHP-4SD works with ISDN ports, or terminal adapter ports, only. The ISIHP-4SD contains no modems in its circuitry.*)

LINUX-RPM -- Dial-in configuration:

To configure a particular port for dial-in, utilities like 'mgetty' need to be installed on the system. If, for example, the port /dev/ttyM2c needs to be configured for a remote-access dial-in connection, an entry of the form '`M2c:12345:respawn:/sbin/mgetty ttyM2c /dev/ttyM2c`' needs to be added in the /etc/inittab file. After you have made the change, execute 'init q' so that the 'init' process re-reads the inittab file and spawns the mgetty process to wait for an incoming connection. Users can then dial in, use their user names and passwords to log in, and access their accounts on the machine.

To disable dial-in access on a particular port, change the entry in the /etc/inittab file to '`M2c:12345:off:/sbin/mgetty ttyM2c`'or just comment-out that entry by prefixing a '#' to the entry on the line.

LINUX-RPM -- PPP setup:

The 'PPP-HOWTO' (a document that is available as a part of the 'HOWTO' documentation on most of the distributions under /usr/doc/HOWTO) explains in detail the procedure for configuring a Linux machine as a PPP server. This information is also available at

http://www.interweft.com.au/other/ppp-howto/ppp-howto.html.

The documentation in the PPP-HOWTO is directly applicable to ISI ports.

Removing the ISI Driver (Linux-RPM)

1. To remove the ISI driver, type `rpm -e isicom`

If more than one instance of the isicom file exists in the system, an error message will be returned. To resolve this, type rpm -q isicom. Press ENTER. All isicom RPM modules will be listed. Decide which of these files you want to delete. Then type `rpm -e filename` to delete those files.

Warning About the Flashing of Terminal Adapter Ports

New versions of firmware for the TA ports on the ISIHI or ISIHP card are issued from time to time. When new TA-port firmware is issued, that code must be "flashed" into the ISIHP/ISIHI card. If the "Flashpro" program is used to flash new firmware versions, the user should flash odd-numbered TA ports only.

For each odd-numbered port selected, the program will flash an odd/even pair of ports (that is, both B-channels of the ISDN connection are flashed on a single command). So, when COM3 is selected to be flashed, COM4 will also be flashed. There is no need to flash the even numbered ports separately. *In fact, attempting to flash odd and even TA ports separately will result in damage to the software that can be repaired only by sending the ISI card back to MultiTech for repairs.*

The correct flashing procedure is presented below.

Firmware Update for ISIHx Terminal Adapters

1. Run FlashPro from the DOS command prompt. Type “flashpro -f -m” and press ENTER.

2. Using the arrow keys, select Configure in the Main Menu and press ENTER.

3. Select the Active Port value in the Configuration menu and press ENTER.

4. Select ISI608/ISI4608/PCI and press ENTER.

5. Select the Baud Rate value in the Configuration menu and press ENTER.

6. Select 115200 and press ENTER.

7. Select the Device Type value in the Configuration menu and press ENTER.

8. Select MODEMFILE and press ENTER.

9. Select the Base-Address-for-Port value in the Configuration menu and press ENTER.

10. Type the base address for the ISI card and press ENTER.

11. Select IRQ Number value in Configuration menu and press ENTER.

12. Specify the IRQ number for the ISI card and press ENTER.

13. Select the ISI-Port-Number value in the Configuration menu and press ENTER.

14. Type 1 and press ENTER.

15. Press Escape to back out to the Main Menu.

16. Highlight Select-File-to-Program in the Main Menu and press ENTER.

17. Select the terminal adapter hex file needed for this ISI card. Then press ENTER.

18. Select Program Firmware in the Main Menu and press ENTER.

19. Wait until the programming of the terminal adapter is complete.

20. Select Configure in the Main Menu and press ENTER.

21. Select the ISI-port-number value in the Configuration menu and press ENTER.

22. Type 3 and press ENTER.

23. Press Escape to back out to the Main Menu.

24. Highlight Select file to Program in the Main Menu and press ENTER.

25. Select the terminal adapter hex file needed for this ISI card. Then press ENTER.

26. Select Program Firmware in the Main Menu and press ENTER.

27. Wait until the programming of the terminal adapter is complete.

28. For ISIHP-4S/4U/4SD, repeat steps 22-27 two more times, typing 5 on the first repetition and typing 7 on the second repetition.

29. Hit Escape to exit from FlashPro. (Select Yes when asked whether to "Save Changes to Disk?" Then press ENTER.)

The terminal adapters on the ISI card are now updated with the new firmware.

Chapter 4: Warranty & Service Information

Limited Warranty

Multi-Tech Systems, Inc. (MTS) warrants that its products will be free from defects in material or workmanship for a period of two years from the date of purchase, or if proof of purchase is not provided, two years from date of shipment. MTS MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. This warranty does not apply to any products which have been damaged by lightning storms, water, or power surges or which have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by the customer or any party without MTS's written authorization, or used in any manner inconsistent with MTS's instructions.

MTS's entire obligation under this warranty shall be limited (at MTS's option) to repair or replacement of any products which prove to be defective within the warranty period, or, at MTS's option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS's factory transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PURCHASE PRICE FOR DEFECTIVE PRODUCTS.

Upgrades and Support

You can access updated versions of firmware, drivers, flash utility programs and other software-related support for ISIHP server cards via the MultiTech web site and/or the MultiTech FTP site.

www.multitech.com. Go to **Support** page. Drivers, software, and firmware are available here. Follow links for manuals, replacements, our warranty, and access to our FTP site.

ftp://ftp.multitech.com. **ISI Cards** have their own directory.

Service

Multi-Tech has an excellent technical support staff available to help you get the most out of your Multi-Tech product. If you have any questions about the operation of this product, call Technical Support at (800) 972-2439. Model and serial numbers are located on the Multi-Tech label on the component side of the ISIHP. To display the firmware version, type ATI1 in terminal mode. Software versions are printed on the diskette labels. Before calling Technical Support, note the status of your equipment, including screen messages, diagnostic test results, problems with a specific application, etc.

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